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Evaporation losses in a year of fallow

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Using the methods of AG Mem 586, the evaporation losses from soil which is uncropped throughout the summer were calculated for Cranwell for the years 1959-1968. Rain-days (W) were the number with 3 mm or more.

The results were for the heavy soils:-

Year		April	May	June	July	Aug	Sept	Total
1959								
	Rain	58.4	19.8	13.0	39.4	33.9	2.0	66.5 mm
	W	6	1	2	7	2	0	18
	PE	72	106	125	131	103	70	607 mm
	E	47.4	25.2	18.5	43.6	27.6	6.3	168.6 mm
1960								
	Rain	15.4	22.4	13.9	82.2	98.8	73.5	306.2 mm
	W	2	2	2	8	11	7	32
	PE	69	100	131	98	89	60	547 mm
	E	32.0	26.7	21.3	61.3	56.4	46.7	244.4 mm
1961								
	Rain	77.3	11.5	11.0	60.8	70.7	54.2	285.5 mm
	W	9	1	1	8	8	5	32
	PE	59	97	119	100	97	62	534 mm
	E	48.2	26.7	17.3	45.5	60.1	37.5	235.3 mm
1962								
	Rain	55.9	36.0	0.9	42.5	76.8	64.4	276.5 mm
	W	6	5	0	3	5	8	27
	PE	67	86	120	95	89	58	515 mm
	E	45.6	39.8	7.1	38.6	51.2	40.3	222.6 mm
1963								
	Rain	50.3	33.1	46.5	30.5	88.7	66.8	315.9 mm
	W	6	4	5	3	7	4	29
	PE	61	100	112	119	75	63	530 mm
	E	46.7	38.2	41.8	38.4	50.2	30.4	245.7 mm
1964								
	Rain	46.9	16.6	70.1	30.7	45.8	7.2	217.3 mm
	W	7	2	8	4	6	0	27
	PE	59	101	86	117	101	69	533 mm
	E	44.7	30.4	57.7	39.1	45.6	8.5	226.0 mm

	April	May	June	July	Aug	Sept	Total
1965							
Rain	40.0	34.5	45.6	59.8	56.2	137.0	373.1 mm
W	5	5	6	7	6	9	38
PE	67	98	108	89	100	55	517 mm
E	45.0	43.8	45.5	55.4	56.4	45.6	291.7 mm
1966							
Rain	68.6	52.5	65.8	59.7	96.1	20.5	363.2 mm
W	7	7	5	5	8	2	34
PE	58	111	109	114	103	58	553 mm
E	51.0	54.4	49.1	51.4	64.3	26.4	296.6 mm
1967							
Rain	44.0	120.1	57.4	23.5	70.6	34.9	350.5 mm
W	5	12	2	2	5	5	31
PE	64	98	124	131	93	56	566 mm
E	47.8	76.5	33.8	30.3	44.7	30.6	263.7 mm
1968							
Rain	60.7	52.0	48.5	147.0	77.2	117.3	502.7 mm
W	7	5	7	5	5	10	39
PE	77	91	108	106	89	56	527 mm
E	44.1	54.1	44.4	52.2	53.0	45.2	293.1 mm

E/PE is highly correlated with W on a yearly basis and a possible regression is

$$(a)\quad \frac{E}{PE} = 0.01W + 0.07\,\frac{R}{PE} \qquad \text{(Multiple correlation 0.94)}$$

A slight improvement if the maximum monthly contribution to the seasonal rainfall total R' is taken as the PE., when

$$(b)\quad \frac{E}{PE} = 0.01W + 0.15\,\frac{R'}{PE} \qquad \text{(Multiple correlation 0.95)}$$

The results were:-

Year	Evaporation	Estimate (a)	Estimate (b)
1959	169	188	179
1960	244	257	259
1961	235	250	251
1962	223	215	218
1963	246	234	238
1964	226	218	216
1965	292	279	279
1966	297	274	283
1967	264	262	267
1968	293	298	305

The mean error is 10-11 mm, about 4 per cent, which is about the same as the errors in R and PE.

Any comments or suggestions on this paper should be referred to the author.

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